Reply to Letter to the Editor re: body physique and heart rate variability determine the occurrence of stair-step artefacts in 64-slice CT coronary angiography with prospective ECG-triggering

Husmann, L ; Kaufmann, P A

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Lars Husmann
Philipp A. Kaufmann

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L. Husmann · P. A. Kaufmann
Cardiac Imaging,
University Hospital Zurich,
Zurich, Switzerland

P. A. Kaufmann
Zurich Center for Integrative Human Physiology, University of Zurich,
Zurich, Switzerland

P. A. Kaufmann (✉)
Cardiovascular Center,
University Hospital Zurich,
Raemistrasse 100, NUK C 32,
CH-8091 Zurich, Switzerland
e-mail: pak@usz.ch
Tel.: +41-44-2554196
Fax: +41-44-2554414

Sir,

We thank the authors for their interest in our work "Body physique and heart rate variability determine the occurrence of stair-step artefacts in 64-slice CT coronary angiography with prospective ECG-triggering" [1]. The authors raise the point that our study "indirectly reveals the high frequency of respiratory motion" as a source of image degradation in CT coronary angiography.

The purpose of our study was to describe and characterize the frequency and extent of stair-step artefacts in CTCA with prospective ECG-triggering and to identify their determinants. To do so, we paid great attention to avoid breathing artefacts by carefully and repetitively practising breathing commands before CT and by retrospectively excluding all patients from the study in whom breathing motion was nonetheless observed. This study design allowed us to show that (1) motion of the entire patient during table travel, particularly in large patients, and (2) motion of the heart, particularly when heart rates are variable, are determinants of stair-step artefacts in CTCA with prospective ECG-triggering. It is needless to say true that stairstep artefacts will also occur if the patient breathes during the CT examination.

Finally, we would like to emphasize that our findings suggest that even a perfectly regular heart rate may not entirely eliminate stair-step artefacts. The latter can only be fully avoided by eliminating the need for table travel such as in latest 320-slice CT generation covering the whole heart in one rotation. However, the impact of stair-step artefacts on the ability to evaluate vessels [2] and on diagnostic accuracy [3] appears to be of limited relevance.

References

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